

## What is claimed is:

1. A proton-conducting polymer membrane wherein 1 to 40 parts by weight of ionomer/solid proton conductor is dispersed in 100 parts by weight of proton-conducting polymer having proton-exchanging groups in side chain.

2. The proton-conducting polymer membrane of Claim 1, wherein said proton-exchanging group is selected from the group consisting of sulfonic acid, carboxylic acid, phosphoric acid, phosphonic acid and derivatives thereof.

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3. The proton-conducting polymer membrane of Claim 1, wherein sulfoalkyl or sulfoaryl groups are inserted in metal phosphate layers of said ionomer/solid proton conductor.

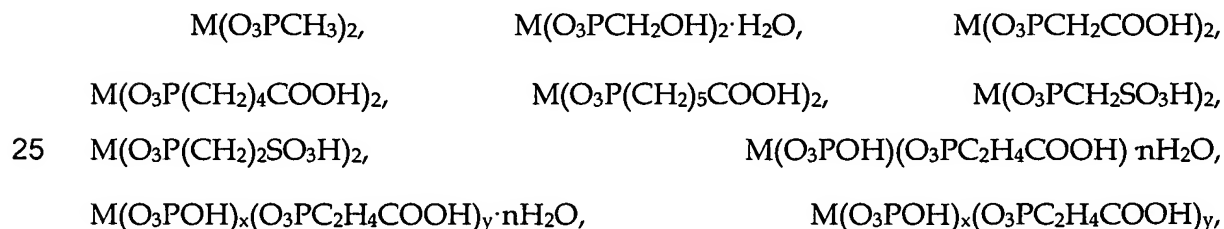
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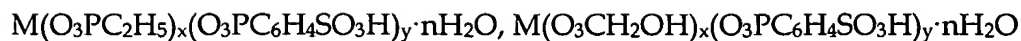
4. The proton-conducting polymer membrane of Claim 3, wherein said metal is a group IV metal.

5. The proton-conducting polymer membrane of Claim 3, wherein said ionomer/solid proton conductor is a compound selected from the group consisting of compounds represented by the following Chemical Formula 1:

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## Chemical Formula 1





wherein M is a group IV element selected from Zr, Ti, Ce, Th and Sn;  $x + y = 2$ ; and n is a real number in the range from 0 to 20.

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6. The proton-conducting polymer membrane of Claim 1, wherein said proton-conducting polymer membrane has a thickness ranging from 30 to 125  $\mu m$ .

7. A method of preparing a proton-conducting polymer membrane  
10 comprising the steps of:

1) dissolving a proton-conducting polymer having proton-exchanging groups in side chain in an organic solvent to prepare a 5 to 10 wt% proton-conducting polymer solution;

2) dispersing a ionomer/solid proton conductor in an organic solvent to  
15 prepare a 5 to 10 wt% ionomer/solid proton conductor solution;

3) mixing said proton-conducting polymer solution and said ionomer/solid proton conductor solution, so that 100 parts by weight of proton-conducting polymer is mixed with 1 to 40 parts by weight of ionomer/solid proton conductor; and

20 4) preparing a polymer membrane using said mixture solution.

8. The method of preparing a proton-conducting polymer membrane of Claim 7, wherein said organic solvent is one or more compounds selected from the group consisting of N-methyl-2-pyrrolidinone (NMP), dimethylformamide (DMF),  
25 dimethylacetamide (DMA), tetrahydrofuran (THF), dimethylsulfoxide (DMSO), acetone, methyl ethyl ketone (MEK), tetramethylurea, trimethylphosphate,

butyrolactone, isophorone, carbitol acetate, methylisobutylketone, *n*-butyl acetate, cyclohexanone, diacetone alcohol, diisobutyl ketone, ethyl acetoacetate, glycol ether, propylene carbonate, ethylene carbonate, dimethylcarbonate and diethyl carbonate.

5            9. A membrane-electrode assembly using the proton-conducting polymer membrane of any one of Claims 1 to 6.

10. A fuel cell containing the membrane-electrode assembly of Claim 9.